Proposed Plan for South Lee County Watersheds

(50% Deliverable)

April 22, 2009

AECOM, Inc. and
A.D.A. Engineering, Inc.

Agenda

- Review problem identification
- Define alternatives to reduce problems
- Review results of modeling analysis
- Review ecologic assessment
- Review modifications to alternatives after review of the ecological assessment and input from SFWMD/Lee County reviewers
- Summarize recommendations

Status of Implementation of 1999 SLCWP Recommendations

Recommendation	Status in 2009
1. Estero River: clean and snag from US 41 to confluence of N and S Branches. Completed. N & S Branch: clean and snag from confluence of branches to I-75	Partially completed by not maintained
2. Estero – N Branch: connect I-75 outfall to headwaters of N Branch, acquire flow-way	Not completed
3. Estero – N Brach: Enlarge existing 2 – 10'x5' box culverts in Three Oaks Parkway	Completed
4. Estero – S Branch: construct Corkscrew Road structure	Completed
5. Channels east of I-75 between Halfway Creek and SB Estero River	Not completed
6. Halfway Creek – Seminole Gulf RR to I-75: channel and structure construction	Completed
7. Halfway Creek – periodic clean and snag vegetation upstream and downstream of US 41	Completed upstream of US 41. Not completed downstream
8. Halfway Creek – FP&L Bridge: replace existing bridge	Completed – removed culverts and approach berms
9. Halfway Creek – RR: replace undersized culverts	Completed
10. Spring Creek – replace Old 41 and FPL and Imperial Harbor crossings	Partially done
11. Imperial River: clean and snag from Matheson Street to Bonita Grand Drive	Completed but not maintained
12. Imperial River: reconstruct IBE Bridge	Completed
13. Imperial River – Matheson Street to Bonita Grande Drive: purchase floodway right of way from willing sellers	Not completed
14. Reconstruct Kehl Canal weir	Completed
15. Corkscrew Swamp Sanctuary South Dike: replace 5 - 30" CMPs with 5 - 72" CMPs in east to west dike located approximately 2 miles north of the north end of Corkscrew Canal.	Completed. Included modification of Corkscrew Canal, construction of 6 bridges and 2 gated weirs.
16. Partially restore Camp Keais flow way between Lake Tafford and SR 846	Some vegetation control was implemented. CR 858 improvements are underway.
17. Activate integrated gage system to monitor Corkscrew Swamp area pool levels and the Imperial River basin	Completed
18. Purchase storage lands to the east of I-75	In progress and substantially complete by CREW and SFWMD. Some land S of Kehl Canal and N of Bonita Beach Rd is in private ownership.
19. Channels east of I-75 between Halfway Creek and SB Estero River	Not completed.

Definition of Existing Problems (page 1 of 2)

- All design storms used August 1, 1995 as the initial condition. This was a very wet period and resulted in higher flood elevations than experienced during Tropical Storm Fay in 2008
- Houses in the Quinn Road area of Bonita Springs experience flooding for the 25- and 100-year events. Pinecrest Lane in Bonita Springs is overtopped for the 25- and 100-year events.
- Flooding of roads in the Manna Christian trailer park is predicted for all design storms. Flooding of the club house is predicted for the 25- and 100-year events.
- Simulated water levels are similar to 10- and 100-year design elevations in the Brooks while predicted peak flows entering the Brooks from east of I-75 are less than one third of design levels.

Definition of Existing Problems (page 2 of 2)

- Water levels appear to be very high in San Carlos Estates. Flooding of houses is expected for all events.
- Flooding is expected for the North Branch of Spring Creek at Cedar Lane and Spring Creek at Countess Lane for the 100-year event.
- Flows in the North Branch of the Estero River appear to result in road flooding at the River's Ford Road bridge in Country Creek Estates and approach roads to the Rookery Road bridge for the 25- and 100-year events.
- Flows in the South Branch of the Estero River appear to result in road flooding during the 100-year event for Country Creek Drive near Split Oak Way.
- Stonybrook runoff is routed to the Estero River I-75 Bridge rather than through Corkscrew Woodlands. Corkscrew Woodlands infrastructure cannot safely handle Stonybrook runoff (see photo on next sheet).

Corkscrew Woodlands Lake Outfall

- The only outfall from the Corkscrew Woodlands Lake is this gated weir.
- Approximate width is 4 ft.
- This outfall may be too small to handle the combination of flows from the Woodlands and Stonybrook

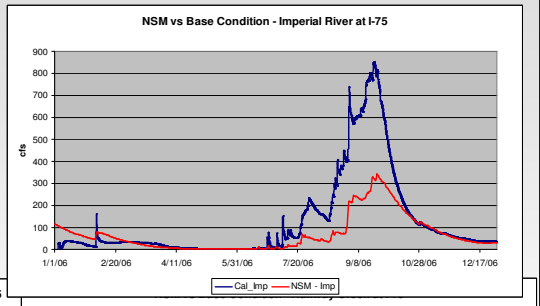
Target Peak Flows for South Lee County

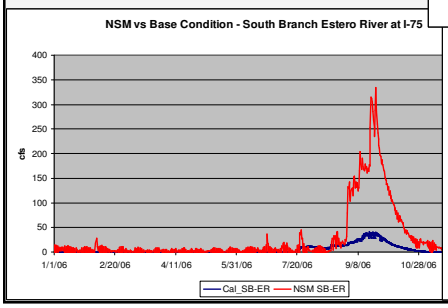
- The measured Imperial River at I-75 peak flow was 2,900 cfs in 1940
- Extrapolating, the pre-development peak flow for the Estero River and Halfway Creek at I-75 is estimated to be 1,800 cfs

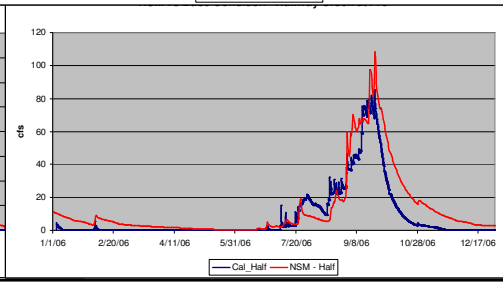
Watershed	Pre-Devel. Peak Q, cfs	Ex Sim 100-Yr Q, cfs	Preferred Plan Sim 100-Yr Q, cfs
Imperial River, I-75	2,900	2,000	1,900
Estero/Halfway, I-75	1,800	1,000	1,512 (with channel east of I-75)

Target Annual Flow Range – S Lee Co

- A comparison of simulated pre-development flows to simulated 2006 flows suggests that we should try to increase flows to the Estero and decrease flows to the Imperial River







Target Flood Control Stages

	Peak	Minimum	
Location	**ft-NAVD**	**FFE**	**Comment**
North Br. Estero R. Rivers Ford Rd Bridge	11.2	FFE = 11.2	From Permit
SB Estero R. Sanctuary Rd	14.7		Bridge deck elev.
SB Estero R. 3,400 ft U/S of Sanct Rd	14.1	Unknown	Elevation of right bank
Halfway Ck Brooks N&S Weirs	16.2	FFE = 16.2	
Halfway Ck between US 41 and RR	15.2		
Spring Creek San Carlos -S of Strike Ln	13	FFE = 12.5	2 houses below 13'
San Carlos Estates - north of Strike Ln	14	FFE = 13.7	2 houses below 14'
Kehl Canal Upstream of Gate	14	FFE = 13.7	Clubhouse
Imperial River - Bourbonniere	10	FFE = 9.3	7 houses below 10'

Note that these are only targets that were considered during the alternatives analysis.

Target Stages for Wetlands East of I-75

	Season		
	Dry	**Wet-avg**	**Hydroperiod**
Wetland Area and Habitat Type	**avg, 1 in 10**	**range**	**range, months**
	ft-NAVD	ft-NAVD	
SB Estero River east of I-75, cypress	13.3, 10.8	15.6 - 16.1	6 - 8
Halfway Ck east of I-75, hydric flatwoods	12.8, 10.3	15.5 - 15.9	1 - 2
Halfway Ck east of I-75, wet prairie	12.4, 9.9	14.9 - 15.4	2 - 6
Kehl Canal at Poormans Pass, hydric flat	12.6, 10.1	15.3 - 15.7	1 - 2
Kehl Canal at Poormans Pass, wet prairie	13.1, 10.6	15.6 - 16.1	2 - 6
Kehl Canal at Vincent Rd, swamp forest	13, 10.5	15.0 - 15.5	8 - 10

Some revision of these targets will be needed because the ground elevations used in this model were based on an old topographic map. Newer more accurate LIDAR data is available. This will affect the recommended elevation of weirs proposed to be installed upstream of the I-75 culverts for the South Branch Estero River and Halfway Creek

Brief Summary of Four Alternatives Evaluated in the 2009 SLCWP Update

1. Improve conveyance in Halfway Creek and add up to 5 new culverts for Halfway Creek under I-75. Add facilities to reduce flooding in Spring Creek and North Branch Estero River
2. Improve conveyance in the South Branch Estero River and Halfway Creek (both with and without additional culverts under I-75)
3. Improve conveyance in Spring Creek with additional culverts under I-75 to Spring Creek
4. Add a storage reservoir to store excess runoff from Imperial River to reduce Bonita Springs flooding. Also improve conveyance in North Branch Estero River, Halfway Creek, and Spring Creek (no additional culverts under I-75)

All alternatives were compared to a base condition run with has the following assumptions

a) Existing 9' x 8' Halfway Creek culverts are assumed to be free of sediment deposits

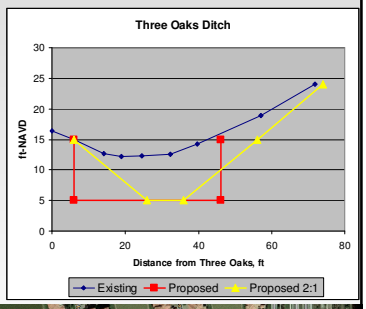
b) The floodplain in Halfway Creek west of U.S. 41 represents the newly excavated FPL cross section (note: the new FPL XS doubled flow for the 100-yr DS)

Ideas Not Used in Alternatives Analysis and Why

Idea	Why Not Used
7. Route water from east of I-75 to Spring Creek via golf course east of San Carlos Estates	Assumed to be more expensive than Idea 6 and results deemed similar to Idea 6
11. Water resources berm east of I-75 from Corkscrew Road to Bonita Grande Drive to raise water levels east of berm	Seepage from upstream of the berm would impact existing residential lands that are south of Kehl Canal and east of Bonita Grande Drive
13. Increase conveyance of the North Branch of Estero River between Alico Road and River Ford Road	Would require significant wetland impacts
14. Improve wetland hydroperiods in CREW lands north of Kehl Canal	This concept was partially evaluated. A more detailed model is needed for further evaluation

Alternative 1 – Halfway Creek Conveyance Improvements

- 5 new 60-inch diameter culverts under I-75
- Change by-pass gates to South Branch Estero River to be fully open during floods. Dropped invert 2 feet during floods
- Remove Three Oaks water quality weir
- Modify Three Oaks ditch to be 40-ft wide with vertical side walls. Invert just D/S went from 12.24 to 6 ft-NAVD. Improve connection to lakes on north end of Halfway Creek between Via Coconut Point and Via Villagio (see figure) New Inv. = 10 ft-NAVD
- Raise wooden walkway west of U.S. 41 by 1.4 feet (13.6 to 15 ft-NAVD)
- Construct new 100-foot wide channel through cypress head from walkway to Fountain Lakes channel. Inv. = 8 ft-NAVD
- Increase conveyance under Rivers Ford Road bridge in North Branch of the Estero River

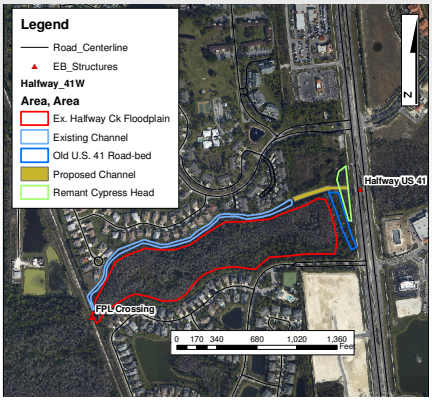


- Doubled Spring Creek culverts at Countess Lane
- New 3x4-ft dia. culverts for Spring Creek North Branch at the railroad, FPL easement, and Cedar Lane. Remove exotic vegetation (Brazilian Pepper)

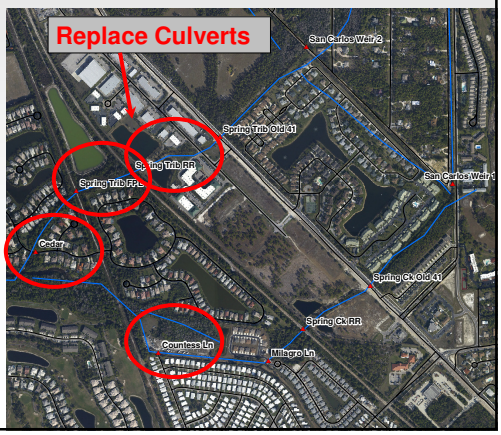
(Additional figures are on the next slide)

Alternative 1 Features

Halfway Creek Conveyance Improvements West of U.S. 41



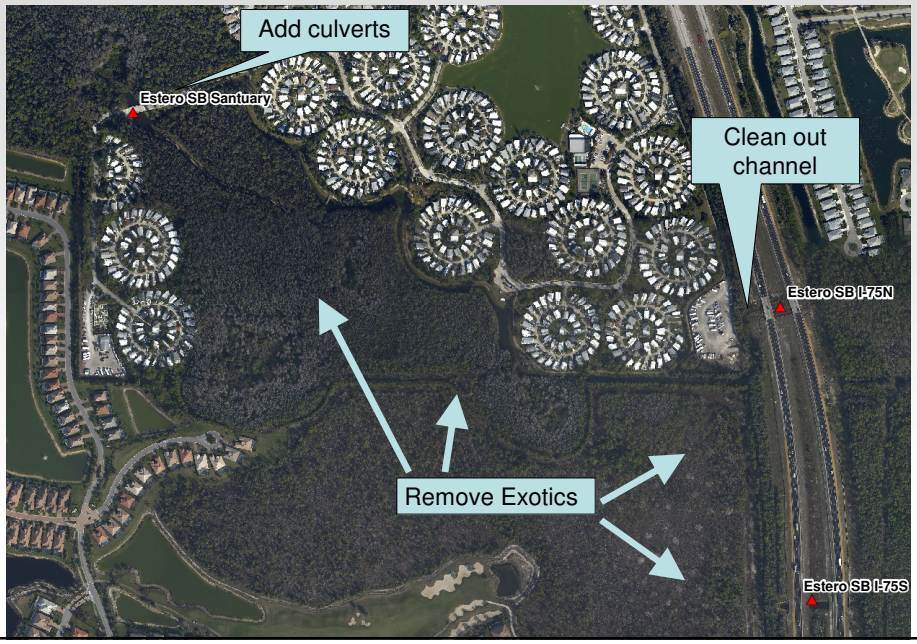
Spring Creek Conveyance Improvements West of Old U.S. 41



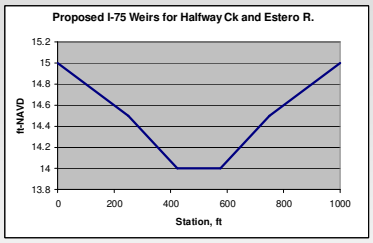
Alternative 2 – Estero River South Branch Conveyance Improvements

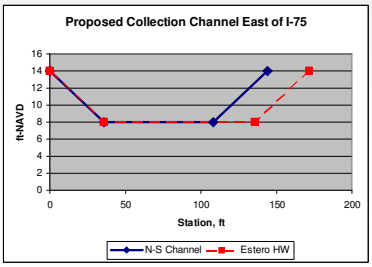
- **First Attempt**: No new 60-inch diameter culverts under I-75
- Implement Three Oaks ditch improvements from Alt 1
- Improve connection to Rapallo lake west of Via Coconut Point, raise wooden walkway west of U.S. 41, and add channel west of U.S. 41
- Clean out the channel of the South Branch next to I-75 and removal of Melaleuca and other exotics from I-75 to Sanctuary Road (see figure on next page). Channel Manning's n decreased from 0.25 to 0.05
- Added two additional culverts under Sanctuary Road (7'x4.5')
- Increase conveyance under Rivers Ford Road bridge in North Branch of the Estero River
- Doubled Spring Creek culverts at Countess Lane
- New 3x8' dia. Spring Creek North Branch culverts at the railroad, FPL easement, and Cedar Lane. Remove exotic vegetation (Brazilian Pepper)
- **Alternative 2_v5 Option:** add 100' wide channels east of I-75 and five new 60-inch culverts under I-75 to Halfway Creek (see diagram)
- Also widened cross section for ER SB bridges in Country Creek

Channel Improvements for the Estero River West of I-75



Details on Alternative 2_v5 Components





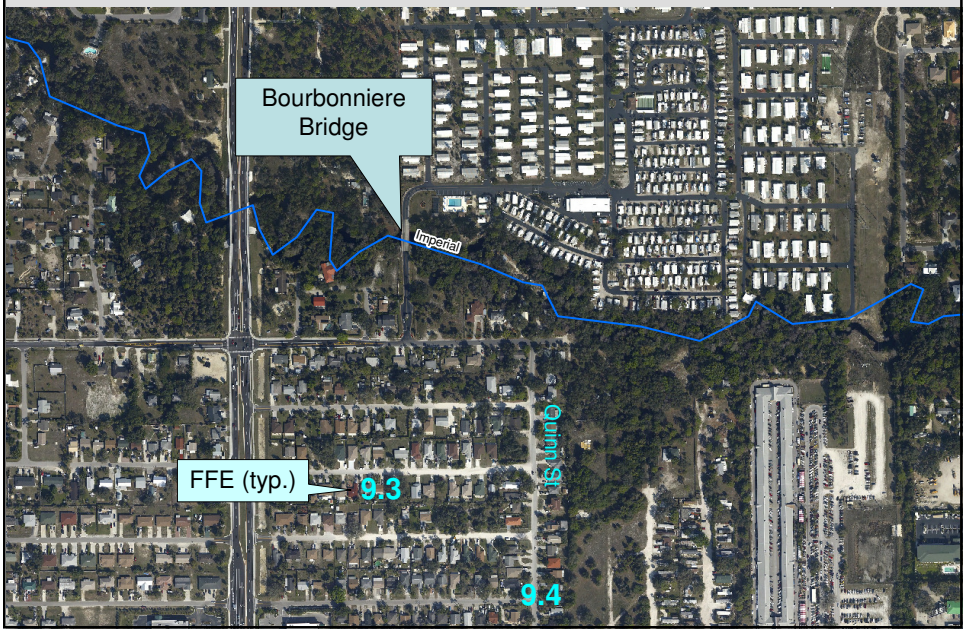
Alternative 3 – Spring Creek Conveyance Improvements

- Add another 8'x4' box culvert under Old U.S. 41 for both Spring Creek channels
- Replace Spring Creek culverts at Countess Lane to equal upgraded Old US 41 culverts
- Replace Spring Creek North Branch culverts at the railroad, FPL easement, and Cedar Lane. Remove exotic vegetation (Brazilian Pepper)
- Double the width of the Moriah and Stillwell weirs
- Double the width of Moriah, Stillwell, and Bonita Bill Canals
- Add two 60-inch culverts under I-75 that discharge to the Bonita Bill Canal and add the existing Three Oaks Parkway Bonita Bill culvert to the model
- Add three 60-inch culverts under I-75 to Halfway Creek, and implemented some of the Alternative 1 improvements for Halfway Creek:
  - Two 60-inch culverts under I-75
  - Inflow channel from Halfway Creek to Rapallo Lake,
  - raised wooden walkway west of U.S. 41
  - Construct new 100-foot wide channel through cypress head west of U.S. 41

Alternative 4 – Storage of Excess Imperial River Runoff in a New Reservoir

- Install a 250-cfs pump in the Imperial River approx. 0.5 miles west of I-75 near Quinn Street and transfer the water to a reservoir east of I-75 and north of Bonita Beach Road. The reservoir is assumed to be lined.
- Increase conveyance under Rivers Ford Road bridge in North Branch of the Estero River
- Implement Three Oaks ditch improvements from Alt 1
- Replace Spring Creek culverts at Countess Lane, railroad, and FPL easement, and Cedar Lane

Imperial River Watershed Near Quinn Street



Initial Results of Alternatives Analysis

- **Alternative 1** 100-year peak flows and stages (ft-NAVD)
  - By-pass flows increase from 10 to 259 cfs
  - Stage in Halfway Ck US 41 drops from 14.9 to 14.3 ft
  - Stage in Halfway Ck Brooks weir drops from 15.5 to 15.0
  - Stage in NB ER Rivers Ford drops from 14.1 to 13.2 ft
  - Stage in Kehl Canal gate HW is unchanged at 14.5 ft
  - Stage in Imperial R. at Bourbon. drops from 10.6 to 10.5 ft
  - No improvement in San Carlos Estates

Note that red text indicates structural flooding

Initial Results of Alternatives Analysis

- **Alternative 2** 100-year peak flows and stages (ft-NAVD)
  - By-pass flows increase from 10 to 244 cfs
  - SB Estero River at I-75 flow increases from 130 to 475 cfs
  - SB Estero R. still has flooding of Country Creek Dr. bridge
  - Halfway Creek flow at I-75 increases from 317 to 630 cfs
  - Stage in Halfway Ck US 41 drops from 14.9 to 14.4 ft
  - Stage in Halfway Ck Brooks weir drops from 15.5 to 15.0 ft
  - Stage in NB ER Rivers Ford remains at 14.1 ft
  - Stage in Kehl Canal gate HW remains at 14.5 ft
  - Stage in Imperial R. at Bourbonniere drops from 10.6 to 10.5 ft
  - No improvement in San Carlos Estates

Note that red text indicates structural flooding

Initial Results of Alternatives Analysis

- **Alternative 4** 100-year peak flows and stages (ft-NAVD)
  - 13,500 acre-feet stored for 100-year event
  - By-pass flows increase from 10 to 90 cfs
  - Stage in Halfway Ck US 41 remains at 14.8 ft
  - Stage in Halfway Ck Brooks weir drops from 15.5 to 15.4 ft
  - Stage in NB ER Rivers Ford remains at 14.1 ft
  - Stage in Kehl Canal gate HW remains at 14.5 ft
  - Stage in Imperial R. at Bourbonniere drops from 10.56 to 10.37 ft
  - No improvement in San Carlos Estates
- Alternative 4 can achieve lower water levels in the Imperial River at Bourbonniere bridge if we increase the pumping rate (see next page)

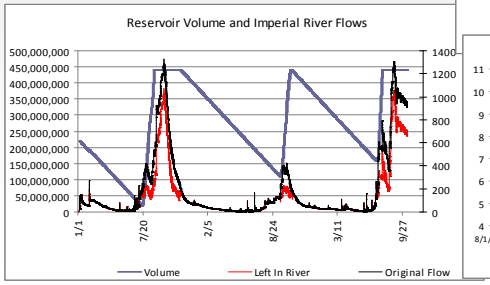
Note that red text indicates structural flooding

Effect of Reservoir Pump Rate on Imperial River Water Levels

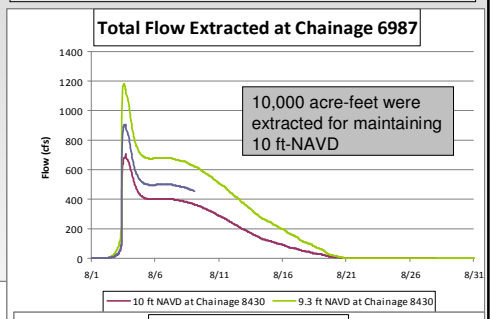
Effect of 250 cfs pump on river levels

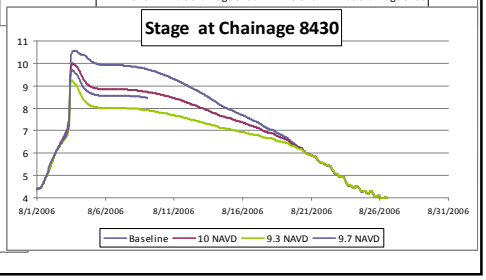
- Using the pump table (shown in blue), the reservoir fills according to the figure below while maintaining adequate flows in the Imperial R.

River Elev	pump
ft-NAVD	cfs
-2	0
0	0
2.75	0
3	50
3.25	75
3.5	100
3.75	150
4.5	175
4.75	200
5	250



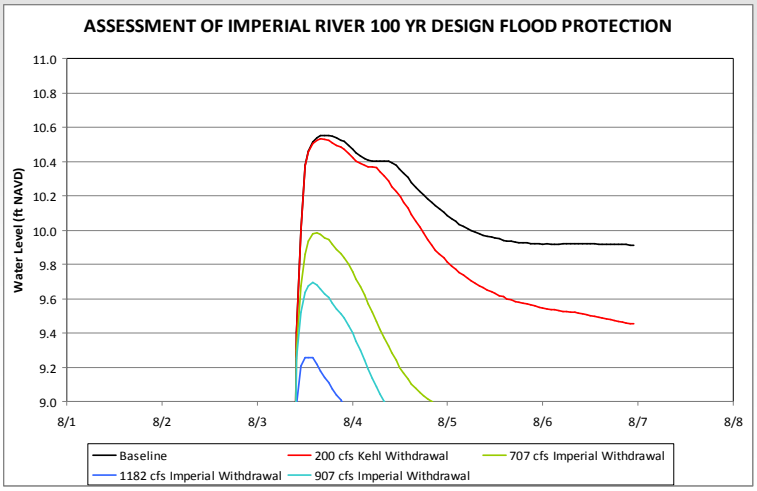
Effect of higher pump rates on river levels





Impact of Reservoir on Duration of Peak Flows

- The reservoir would decrease the duration of flood stages
- The reduction in flood duration increases with pump capacity



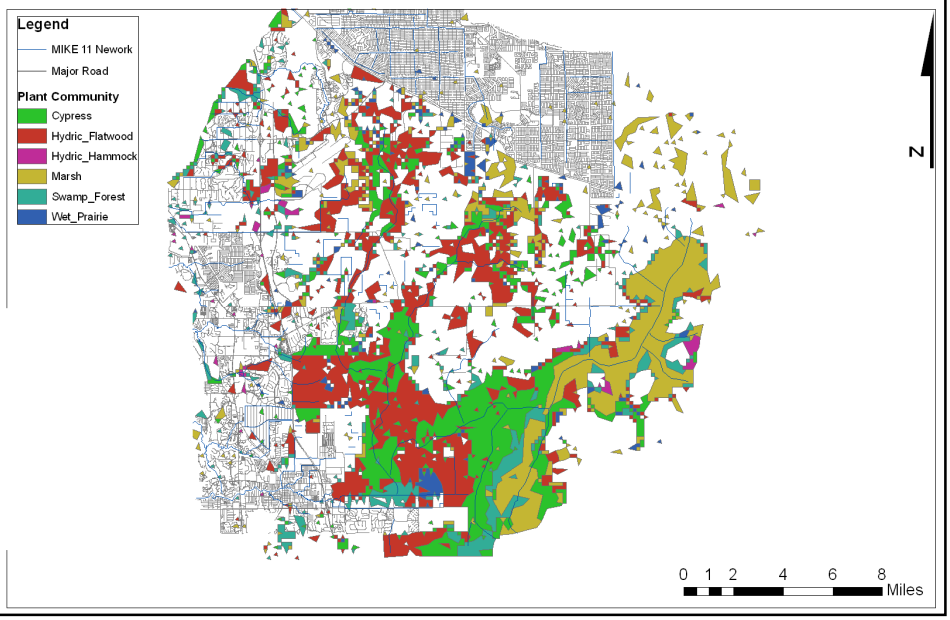
Ecologic Evaluation of Alternatives

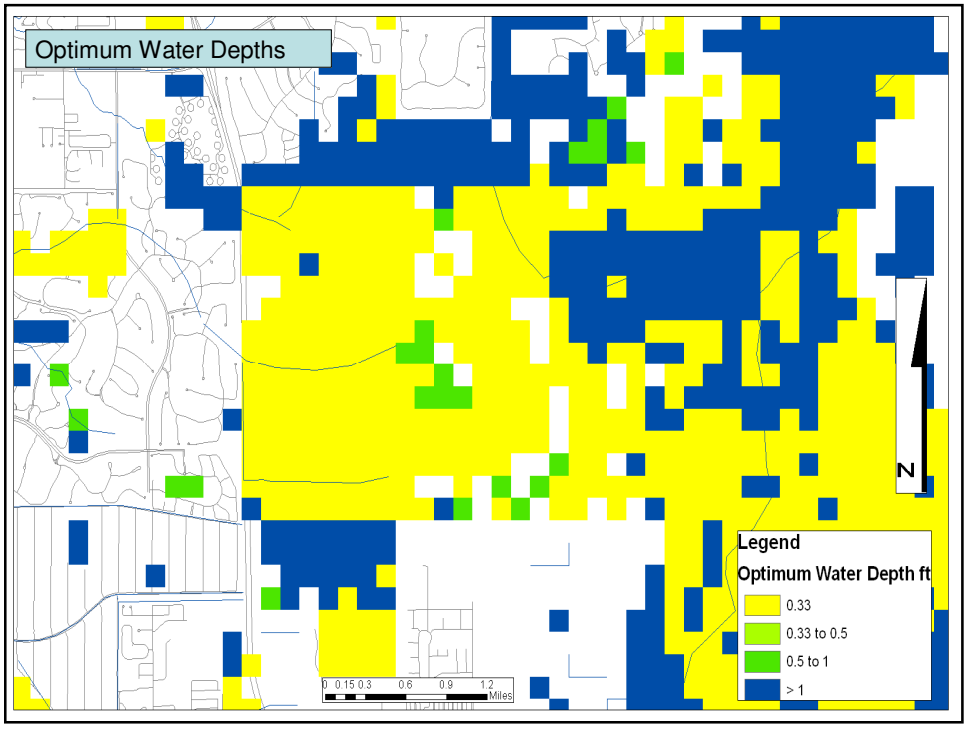
- The first step was to visit the site and determine conditions of wetlands east of I-75. This was summarized in our ecologic assessment deliverable.
- The next step was to determine optimum summer average wet season water depths for wetland communities. See table →
- Then a map of optimum depths was created
- The base condition model was then compared to the optimum depths and a difference map was created for the summer of 2006 (we will repeat this analysis using data from 2006-2008)
- The same step was used for each alternative
- The alternatives were also compared to the base run
- Statistics were used to see the difference between the alternatives and the base and the alternatives and optimum depths

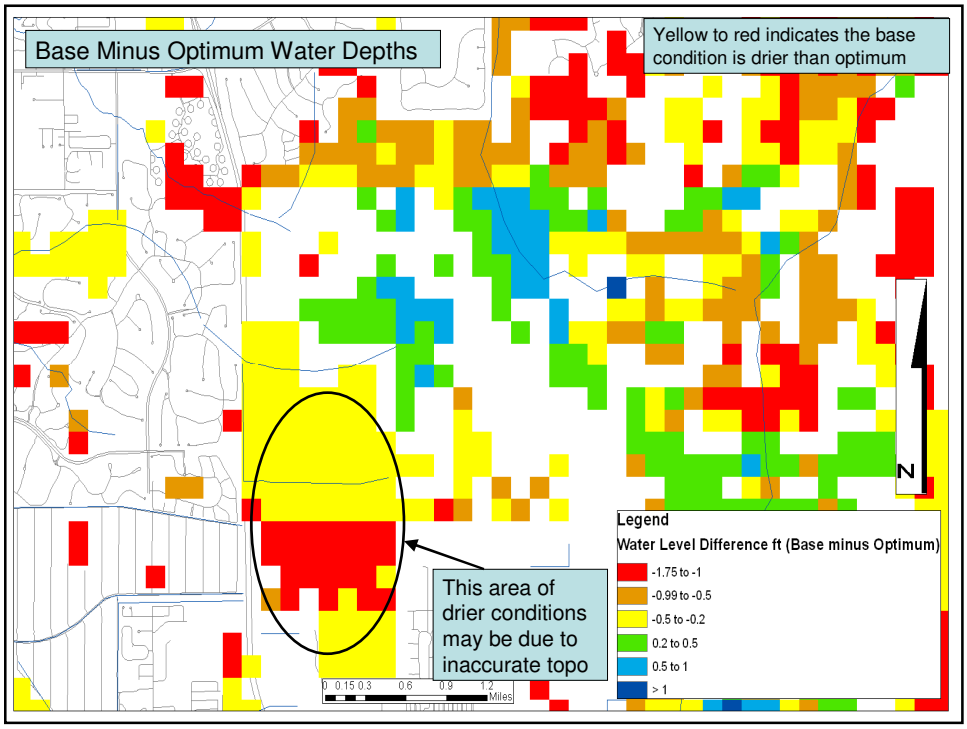
Land Use Type	Opt. Depth, ft
Hydric Flatwood	0.33
Hydric Hammock	0.33
Wet Prairie	0.75
Dwarf Cypress	0.75
Marsh	1.5
Cypress	1.25
Swamp Forest	1.75

The wet season is defined as July 1 through October 31

Wetland Vegetation Map Used in MIKE SHE







Summary of Alternatives

- Halfway Creek flows and stages are best for Alternative 1
- South Branch Estero River flows at I-75 are improved most for Alternative 2
- Spring Creek stages are improved most for Alternative 3
- Imperial River stages are controlled best by Alternative 4

- Alternative 3 was eliminated because:
  - Alternative 3 requires purchase of 95 lots in San Carlos Estates, and 24 of these 95 lots have houses on them
  - Alternative 3 also requires construction of additional 4'x8' box culverts under Old U.S. 41
- Alternative 4 was eliminated as a flood control alternative because:
  - A reservoir would cost at least $40,000,000 and would not eliminate flooding in the Quinn Street area

- Next step: take the best of Alternatives 1 and 2 and re-evaluate

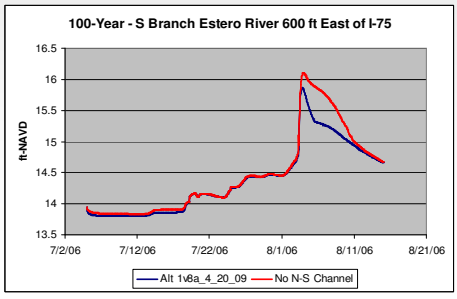
Refinement of Alternatives

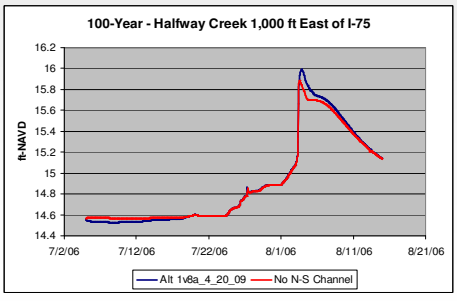
- Improvements from Alternatives 1 and 2 were merged with two variations:
  - With and without a N-S channel east of I-75 from SB Estero to Halfway Creek
- Tests were conducted to determine impacts from:
  - Deleting excavation of Halfway Ck. cypress swamp west of U.S. 41
  - Deleting raising of Halfway Cr. wooden walkway west of U.S. 41
  - Blocking N-S channel just west of Via Coconut Point Road
  - Doubling width of channel in SB Estero River just west of I-75
- Results are presented on subsequent slides

Comparison of Alt 1v8a and Alt 1v8b

- Alt 1v8a has a N-S channel east of I-75 from Halfway Creek to the South Branch Estero River
- Alt 1v8b does not have this channel

- There were no differences in wetland water levels during a one-year run using 2006 rainfall
- 100-Year stage data shown below indicate that the N-S channel results in lower elevations in the headwater of the SB ER and higher water levels in the headwaters of Halfway Creek
- The difference is minor, less than 0.2 feet





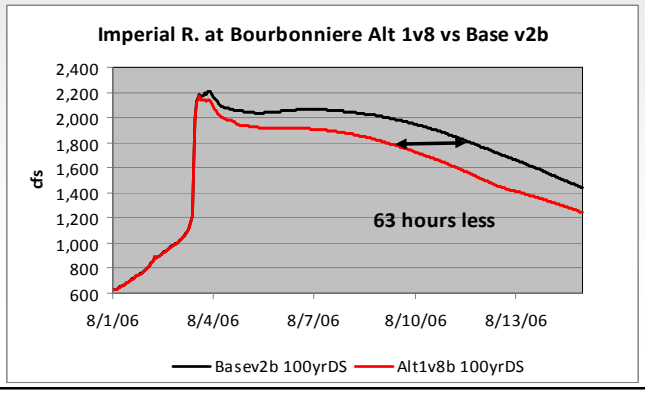
Comparison of Refined Alternatives to Targets and the Base Run

- Alternative 1v8a is recommended since it has the highest flow through I-75 for the combination of Halfway Creek and South Branch Estero River

Station	Branch H & Q Chainages	Target Stage/Flow		Base_v2b		Alt_1v8a- 4-20		Alt1_v8b	
		Stage	Flow	Stage	Flow	Stage	Flow	Stage	Flow
Kehl Canal Gate HW	KehlCan 30702, 30767	13		14.61	1,975	14.36	1,768	14.30	1,745
Imperial R I-75	Imperial 4588, 4888	22.8		12.15	2,019	12.08	1,930	12.03	1,872
Imperial R Bourbonniere	Imperial 8430, 8488	9.3		10.55	2,208	10.53	2,169	10.53	2,156
Halfway I-75	Halfwayup 5889, 6049	22		16.01	328	15.75	530	15.56	311
Brooks By-pass	HalfwayCR 3937, ThreeOaks 25		160	15.52	41	15.04	244	14.98	230
Halfway Brooks N Weir	HalfwayCRDS 10259, 10400	15.8		15.50	646	14.98	636	14.92	690
Halfway Brooks S Weir	HalfwayCrS 7450, 7555	15.8		15.59	138	15.34	166	15.32	173
Halfway U.S. 41	HalfwayCRDS 12800, 12870	15.2		14.91	759	14.43	784	14.39	765
SB Estero R. I-75	EsteroRivS 99, 252	20.7		17.57	130	15.75	452	16.02	526
SB Estero R. Sanctuary	EsteroRivS 4100, 4200	14.6		14.25	340	14.73	514	14.78	571
SB Estero R. 3 Oaks Pkwy	EsteroRivS 6299, 6364	<15.0		13.90	472	14.61	768	14.64	782
SB Estero R. Corkscrew Rd	EsteroRivS 8628, 8697	<16.0		13.76	481	14.36	805	14.39	816
SB Estero R. County Ck Dr	EsteroRivS 11155, 11250	10.7		10.83	940	11.25	1154	11.26	1160
NB Estero R I-75	EsteroI75 328, 450	24.7		17.19	530	17.19	530	17.19	530
NB Estero R Rivers Ford	EsteroRiv 4944, 4980	11.2		14.13	896	14.13	896	14.11	896
Strike Lane at Fairway	StrikeLn 4921	13		15.62	#N/A	14.52	#N/A	14.48	#N/A
Combined I-75 Flow Halfway + South Br. Estero R.					458		982		837
Volume Stored, Ac-ft									

Duration of Flooding for Alt 1v8 vs Base

- The diversion of flows to southern CREW lands decreases the duration of high flows in the Imperial River.
- The duration of flows above 9.3 ft-NAVD is 63 hours less for Alt 1v8 than for the base



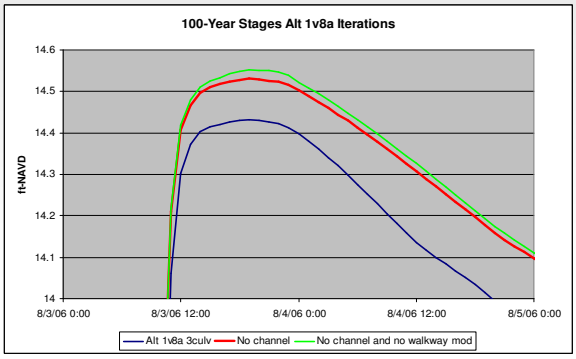
Assessment of Channel Through Cypress Dome in Halfway Creek West of U.S. 41

- The model was run using Alt 1v8a because it had the most flows in Halfway Creek
- First, the channel was deleted and the results were compared to the run with the channel
- This was repeated without the channel and without the wooden walkway modification

Conclusion:

Excavation through the cypress swamp west of U.S. 41 is not necessary.

Improved clearing of dead vegetation is recommended



Comparison of Alt 1v8b and Alt 1v8b with a widened cross section for the SB Estero River just west of I-75

- No change from doubling bottom width of cross section

Impact of Filling Via Coconut Point Ditch

- Filling in the ditch just east of Via Coconut Point between the main stem and South Branch of Halfway Creek was evaluated.
- Design storm results show that the South Branch of Halfway Creek has peak stages 0.1 ft higher than the main stem for the base condition
- Alternative 1 improves conditions for both branches, but the improvement is greater for the main stem
- This block flips the peak stages:
  - with the ditch block, the main stem WL is higher, and the South Branch WL is lower by the same difference (0.3 feet)
- This component is not part of the final plan because the 100-year peak stages do not threaten structural flooding in the Brooks and the Via Coconut ditch allows greater overall conveyance to U.S. 41

Conditions if there was a repeat of 1995 rainfall

- The recommended alternative would improve conditions throughout the study area

	Target Stages and Flows		Alt1v8b 1995 Event		Basev2 1995 Event	
Branch H & Q Chainages	Water Level	Discharge	Water Level	Discharge	Water Level	Discharge
KehlCan 30702, 30767	13		13.9	1,346	14.1	1,567
Imperial 4588, 4888	22.8		11.2	1,467	11.6	1,685
Imperial 8430, 8488	9.3		8.3	1,506	9.0	1,766
Halfwayup 5889, 6049	22		13.1	166	14.2	206
HW 3939, ThreeOaks 25		160	13.0	166	13.9	9
HalfwayCRDS 10259, 10400	15.8		12.9	200	13.8	359
HalfwayCrS 7450, 7555	15.8		13.8	64	13.9	68
HalfwayCRDS 12800, 12870	15.2		12.4	261	13.6	399
EsteroRivS 99, 252	20.7		14.7	257	16.8	67
EsteroRivS 4100, 4200	14.6		13.2	295	11.6	98
EsteroRivS 6299, 6364	<15.0		12.1	507	9.6	143
EsteroRivS 8628, 8697	<16.0		11.5	502	9.1	184
EsteroRivS 11155, 11250	10.7		8.0	629	6.9	321
EsteroI75 328, 450	24.7		16.0	102	16.0	102
EsteroRiv 4944, 4980	11.2		10.8	258	10.5	232
StrikeLn 4921	13		13.8	#N/A	13.9	#N/A

Stage in ft-NAVD and flows in cfs

Overall Recommendation – Alternative 1v8a

- The vegetation maintenance program needs to be enhanced. Exotic vegetation includes Melaleuca and Brazilian Pepper, which are very difficult species to control. Re-invasion rates are high, therefore annual inspections are needed with removal as necessary. Locations that need inspections include
  - South Branch Estero River west of I-75
  - Spring Creek North Branch at the railroad and FPL easement
  - Halfway Creek east and west of U.S. 41
- Vegetation needs to be removed from the floodplain. The practice of making tee-pees of removed vegetation in the floodplain should be abandoned.
- Bridge and/or culvert replacements are needed for:
  - Rivers Ford Road (NB Estero)
  - Sanctuary Road Bridge and Country Creek Lane Bridge (SB Estero)
  - Spring Creek at Countess Lane, and NB railroad, FPL easement, and Cedar Lane
- The Three Oaks Parkway By-pass ditch needs to be enlarged and the water quality weir needs to be abandoned and replaced with alternative treatment
- A direct connection is recommended for Halfway Creek to the Rapallo Lake west of Via Coconut Point
- Addition of a N-S channel east of I-75 increases overall flood flows to Halfway Creek and the South Branch Estero River without impacting wet season and dry season water levels
- Additional modeling is recommended to select the best elevation for weirs upstream of I-75. These weirs will improve the hydroperiod for wetlands east of I-75.
- The Quinn Road area flooding problem cannot be solved without a very expensive reservoir construction project. In order to prevent flooding these houses may have to be either raised or purchased via a willing seller program.